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SPRUCE BUDWORM INFESTATION IN YELLOWSTONE NATIONAL PARK 1956

By Philip C. Johnson, Entomologist

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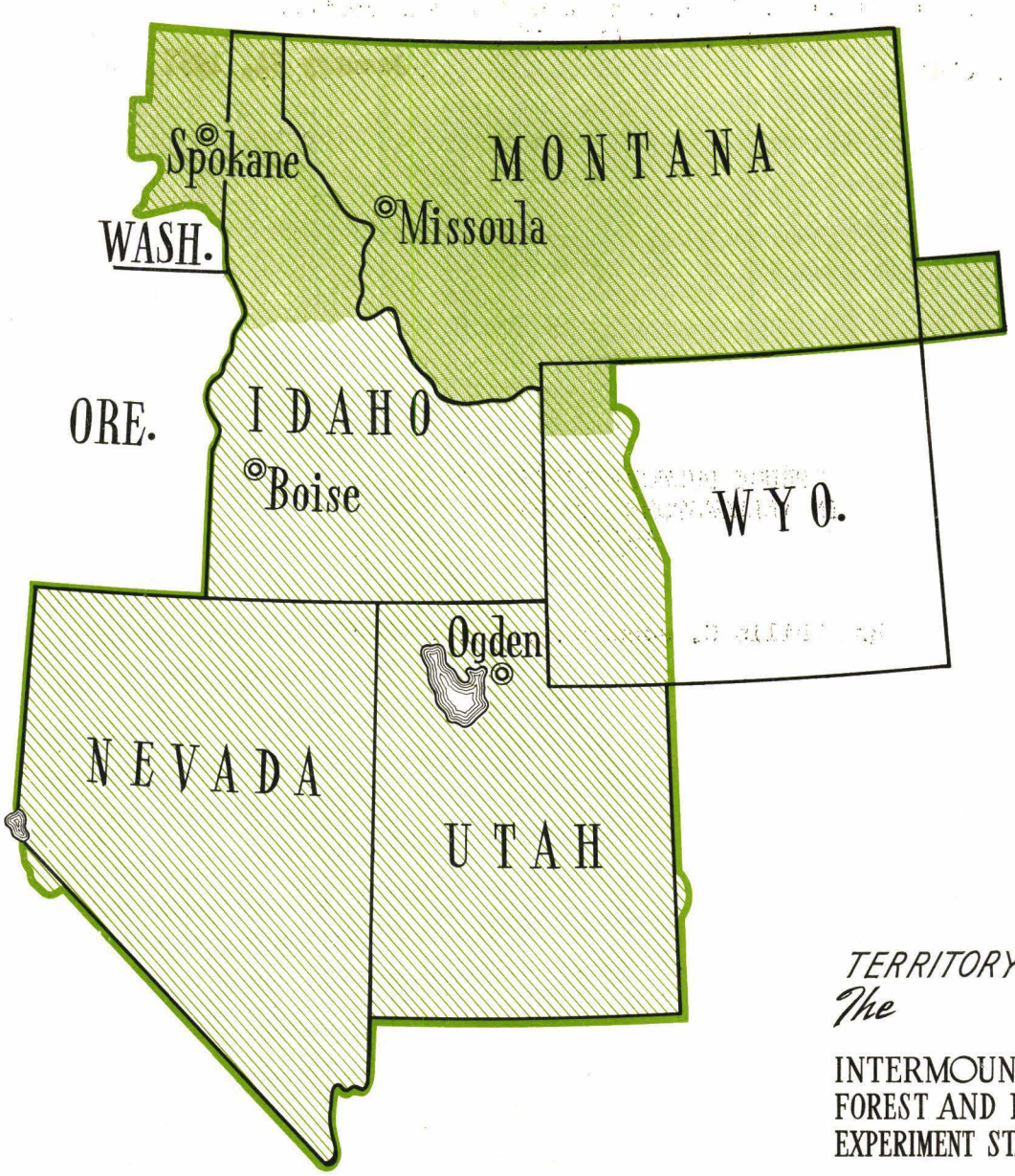
Prepared By The
Missoula Forest Insect Laboratory
Missoula, Montana

The AREA COVERED BY THIS REPORT



TERRITORY OF.. The

INTERMOUNTAIN FOREST AND RANGE EXPERIMENT STATION

The MISSOULA FOREST INSECT LABORATORY is a field unit of the Intermountain Forest and Range Experiment Station at Ogden, Utah. The Laboratory conducts forest insect research, surveys forest insect outbreaks, and gives technical advice on cooperative insect control programs in Montana, northwestern South Dakota, northwestern Wyoming, northern Idaho, and northeastern Washington.

The functions are conducted in the remaining station territory by staff entomologists at Ogden, and Boise, Idaho.

SPRUCE BUDWORM INFESTATION IN YELLOWSTONE NATIONAL PARK 1956

The first of the current series of spruce budworm[1/] infestations reported in Yellowstone National Park was detected in 1952. The infestation covered 2,000 acres in the vicinity of Mt. Everts. In 1954 aerial and ground surveys by the Missoula Forest Insect Laboratory showed that spruce budworm infestations covered 55,410 net acres of Douglas-fir in an area bounded by Electric Peak, Bunsen Peak, Tower Falls, the lower reaches of the Lamar River, thence northwestward to Hellroaring Creek, thence westward along the Park boundary. The 1952 infestation was controlled in July 1953 and the infestation reported in 1954 was controlled in July 1955. The control measures involved the use of a DDT-oil solution applied as a fine spray mist from low flying airplanes during the 4th and 5th larval instars. The operations were successful in killing an average of more than 90 percent of the budworm population.

The Laboratory in 1956 completed another appraisal survey of budworm infestations in the Park. The surveys employed aerial observation to detect any new outbreaks and ground methods to sample the residual effect of the 1955 control operations. Results of these two survey phases will be reported separately in the following paragraphs.

NEW INFESTATIONS

The 1956 aerial survey showed a total of 142,500 acres of budworm infestation now existent in the Park. The infested area is shown on the attached map. This gross acreage is made up of 90,620 acres included in the infested area controlled in 1955 and 51,880 acres of infestation visible for the first time in 1956. Actually, 5,430 acres of the newly detected infestation was visible in 1955 when the aerial survey was made following the control treatment. The above gross acreages include a number of non forested openings or of forest tree species other than Douglas-fir which are not susceptible to the budworm. When these openings or non host type are deducted from the gross acreages the following net budworm infested acreages apply:

Infestation controlled in 1955 - - - - - - - 55,410 acres

New infestation in 1956 - - - - - - - - - - 38,910 acres

1/ Choristoneura fumiferana (Clem.)

Much of the new infestation appeared to have caused a moderate to heavy defoliation in 1956. Because of the luxuriant Douglas-fir foliage growth in 1956, however, some of this defoliation was obscurred. The defoliation was especially noticeable during the August aerial survey in the Soda Butte Creek, Slough Creek, and main Lamar River drainages. At this time the infested fir stands appeared to have a dull reddish tinge from the accumulation of partially devoured needles on the 1956 foliage growth.

The origin and spread of the Yellowstone Park spruce budworm infestations in the past 4 years cannot be accurately accounted for. There is some indication that the infestation has spread in this time up the Yellowstone and Lamar Rivers from the first infestation reported in 1952 near the junction of the Yellowstone and Gardiner Rivers. Considerable budworm infestation existed prior to this time in that portion of the Gallatin National Forest immediately north of the Park boundary. There is considerable evidence that the Yellowstone infestations did not occur entirely as a result of moth flights into the infested areas, but that they developed "in places". This, in effect means that epidemic budworm populations developed on the spot from endemic native populations which were subjected to environmental conditions favorable to rapid insect population growth. This condition is believed responsible for much of the budworm infestation development in Montana during the current infestation cycle. It is quite possible that the budworm population responsible for the visible infestation in 1956 was developing even while control operations were under way in 1955 in adjacent areas.

No ground survey work was done in 1956 in the infested areas in which defoliation first became visible this year. From experience in other areas, however, there is reason to expect that the infestation will continue unabated in 1957 with further defoliation. This may cause very severe defoliation and some mortality in the very young Douglas-fir trees of reproduction size commonly found in the fir forest understory.

In January 1957 bole sections were collected from infested trees in various parts of the Soda Butte and Slough Creek drainages and taken to the Missoula Forest Insect Laboratory. The sections will be placed in insect rearing cans and placed in an environment which will force the breaking of hibernation of the overwintering budworm larvae under the outer bark flakes of the sections. Emergence of the larva from the hibernaculae should occur some time in February. This emergence will make it possible to evaluate the magnitude of the overwintering budworm population and the consequent defoliation which may occur from the feeding of this population during the summer of 1957.

RESIDUAL EFFECTS OF 1955 CONTROL

During the summer of 1956 the Laboratory operated several ground appraisal budworm survey crews in that portion of the Park controlled by aerial spraying in 1955. The crews obtained measurements of 1956 budworm defoliation to assess the residual benefits of the 1955 control program. A total of 154 sampling stations were established within the control boundary. At each sampling station 100 1956 foliage terminals were collected and examined for budworm feeding. Total defoliation averaged 10 percent in the 1955 control area. This is in contrast to an average of 68 percent total 1956 defoliation measured by these same crews in the Mill Creek and other drainages in the Gallatin National Forest which were not included in the ~~1956~~ 1955 control program. From this evidence, it appears that the 1955 control program in the Park very effectively reduced the amount of budworm defoliation in the control area in 1956. This reduced defoliation coupled with the abnormally heavy foliage growth in 1956 resulted in a very satisfactory "greening" in 1956 of the areas controlled in 1955.

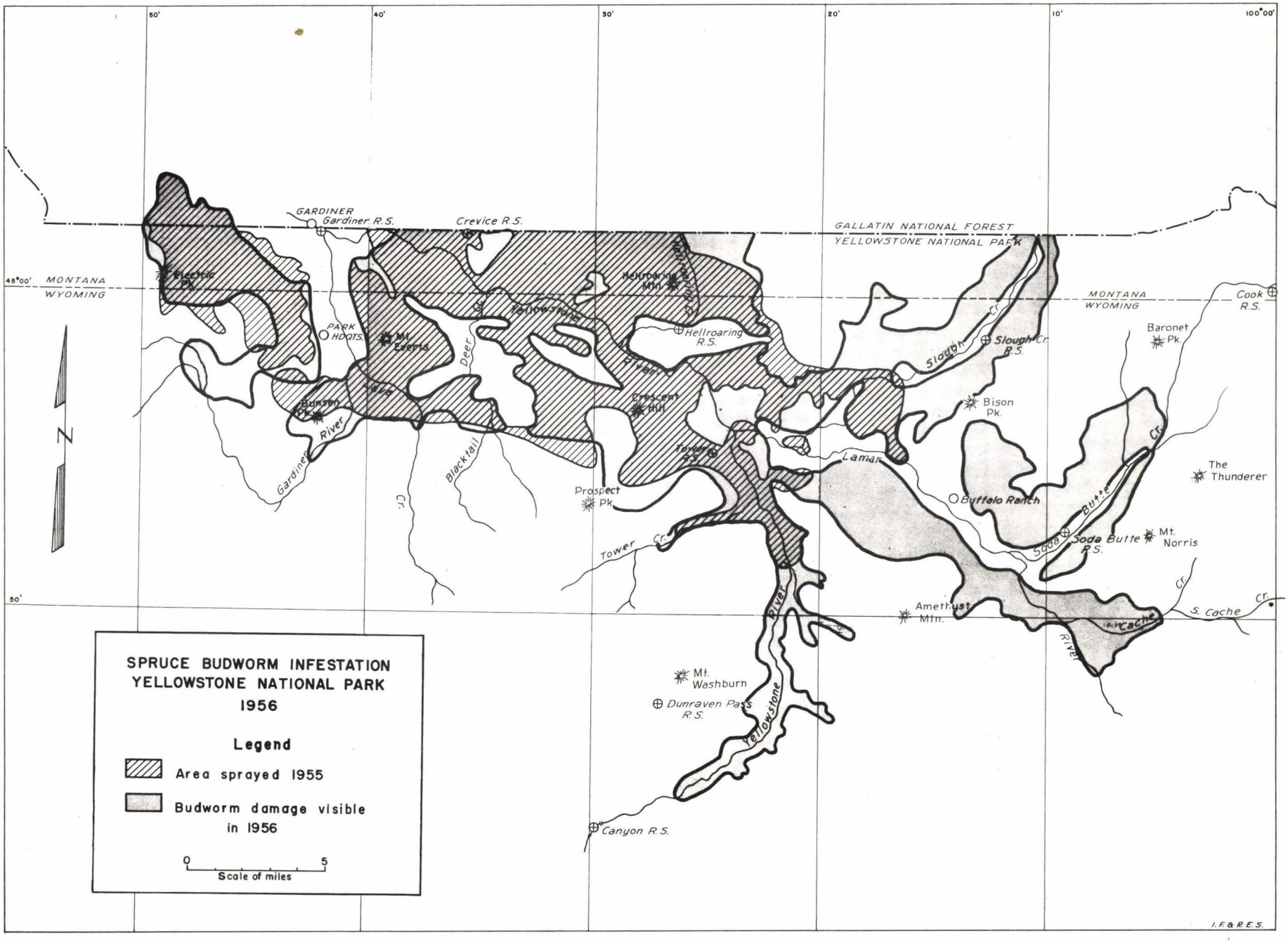
While the over-all loss of 1956 foliage was only 10 percent in the 1955 control area, it is significant that this figure increased to an average of 35 percent in the 18 easternmost ground sampling stations located in the Little Buffalo Creek and lower Slough Creek drainages. This may reflect some budworm infiltration into this part of the 1955 control area from the new infestations which were developing in the Lamar River, Soda Butte and upper Slough Creek drainages. Except for this higher degree of defoliation in the easternmost end, the remainder of the 1955 control area would show even a lower rate of defoliation in 1956.

SUMMARY

The 1956 budworm appraisal survey in Yellowstone National Park showed good residual benefits from the aerial spraying of the 55,410 infested acres controlled by aerial spraying in 1955. Defoliation in the controlled area in 1956 averaged 10 percent of the 1956 foliage--considered very light--and was far under the 68 percent which occurred in uncontrolled portions of the Gallatin National Forest immediately north of the Park. The surveys further disclosed additional budworm infestations in 1956 which covered a net infested Douglas-fir area of 38,910 acres in the main Lamar River and several of its principal tributaries, the Soda Butte and Slough Creek drainages. The infestation also extended up the main Yellowstone River towards Canyon Ranger Station approximately 10 miles beyond the extent of the 1955 infestation. The trend of the new infestation is not expected to decline and further defoliation and possible extension of infestations into additional host type may occur in 1957.

REFERENCES

Terrell, Tom T. Spruce budworm infestation in Yellowstone National Park, 1955. Unpublished report of the Missoula Forest Insect Laboratory, Intermountain Forest and Range Experiment Station, U. S. Forest Service, Ogden, Utah. January 11, 1956. (Processed.)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40'
30'
20'
10'
100°00'
45°00'
MONTANA
WYOMING
GARDINER
Gardiner R.S.
Crevice R.S.
GALLATIN NATIONAL FOREST
YELLOWSTONE NATIONAL PARK
Electric Pk.
Hellroaring Mtn.
Hellroaring Creek
Hellroaring R.S.
PARK HDQTS.
Mt. Everts
Yellowstone R.
Deer Cr.
Bunsen Pk.
Gate
Gardiner River
Blacktail Cr.
Crescent Hill
Tower R.S.
Prospect Pk.
Tower Cr.
Lamar
Slough Cr.
Slough Cr. R.S.
Bison Pk.
Baronet Pk.
Cook R.S.
The Thunderer
Buffalo Ranch
Soda Butte Cr.
Soda Butte R.S.
Mt. Norris
Amethyst Mtn.
Lamar River
S. Cache Cr.
Mt. Washburn
Dunraven Pass R.S.
Yellowstone River
Canyon R.S.
N
SPRUCE BUDWORM INFESTATION
YELLOWSTONE NATIONAL PARK
1956
Legend
Area sprayed 1955
Budworm damage visible in 1956
0
5
Scale of miles
I.F.&R.E.S.